

**REMARKS**

The Office action mailed February 28, 2006, rejects claims 24-38. The applicant respectfully requests reconsideration of the rejections in light of the following remarks.

**I. Interview summary**

On May 19, 2006, the applicant's representative and Examiner Cleveland discussed the double-patenting rejection presented on pages 5 and 6 of the Office action. The examiner explained that the examiner intended to apply a nonstatutory double patenting rejection in accordance with the text of section 9 of the action.

**II. Response to § 103(a) rejections**

Claims 24, 26, 30, and 31 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,658,710 ("Neukermans") in view of U.S. Patent No. 5,853,492 ("Cathey") and further in view of U.S. Patent No. 5,747,384 ("Miyamoto"). Additionally, claims 25, 32, 33-35, and 37 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Neukermans in view of Cathey, Miyamaot, and U.S. Patent No. 4,624737 ("Shimbo"); claim 27 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Neukermans in view of Cathey, Miyamoto, and U.S. Patent No. 4,411,734 ("Maa"); claims 27, 28, and 33-38 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Neukermans in view of Cathey, Miyamoto, Maa, and U.S. Patent No. 5,917,213 ("Iyer"); and claim 29 stands rejected under 35 § 103(a) as unpatentable over Neukermans, Cathey, Miyamoto, and U.S. Patent No. 5,186,670 ("Doan"). These rejections are respectfully traversed.

Regarding claim 24, the cited prior art does not render claim 24 unpatentable at least because the cited prior art does not teach or suggest all the features of the claim.

Claim 24 defines a method comprising, *inter alias*, "exposing at least a portion of said at least one current emitter to a nitrogen infusion process". The cited prior art does not teach this feature.

The Office action asserts that Neukermans discloses this feature (see p. 2, line 17, of the action). This assertion is contrary to an opinion from the Board of Patent Appeals and Interferences in a related application. Attached is a copy of *Ex parte Raina*, Appeal No. 2006-0374 (B.P.A.I. March 15, 2006). In *Ex parte Raina*, the Board considered whether Neukermans disclosed a claim feature similar to the feature of claim 24 cited above and concluded the following.

[T]he examiner has erroneously determined that Neukermans' method of treating an array of current emitters . . . includes the step of "exposing the native oxide-free tip of said at least one current emitter to a nitrogen infusion process"

....

[I]t is apparent that Neukermans' column 3 method of treating an array of current emitters . . . would fail to include the appealed claim 1 step of "exposing said hydrogenation process-treated tip of the at least one current emitter to a nitrogen infusion process".

*Ex parte Raina* at 4-5 and 6-7.

This conclusion in *Ex parte Raina* applies to claim 24 because the feature considered by the Board is similar to the feature of claim 24 cited above. Thus, claim 24 is not unpatentable over the cited prior art at least because the cited prior art does not teach or suggest a process comprising "exposing at least a portion of said at least one current emitter to a nitrogen infusion process".

Claims 32, 33, and 37 are not unpatentable over the cited prior art at least because each one of these claims comprises a feature comparable to the feature of claim 24 discussed above. Claims 25-31, 34-36, and 38 are not unpatentable over the cited prior art at least because each one of these claims depends from an allowable base claim.

### III. Response to double patenting rejection

Claims 24-28 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5, 7-11, and 24-27 of U.S. Patent Application No. 10/120,511. These rejections are respectfully traversed.

The rejection set forth in the action does not establish a *prima facie* case of nonstatutory obviousness-type double patenting. Section 804(II)(B)(1) of the M.P.E.P. sets forth the requirements of a nonstatutory obviousness-type double patenting rejection. Specifically, the section explains

[a]ny obviousness-type double patenting rejection should make clear:

- (A) The differences between the inventions defined by the conflicting claims — a claim in the patent compared to a claim in the application; and
- (B) The reasons why a person of ordinary skill in the art would conclude that the invention defined in the claim at issue would have been an obvious variation of the invention defined in a claim in the patent.

M.P.E.P. § 804(II)(B)(1) (page 800-21).

In this case, the only rational for the rejection is "although the conflicting claims are not identical, they are not patentably distinct from each other because they merely represent different combinations and permutations of the various claimed features."

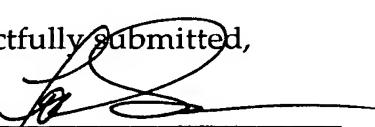
This rational does not establish a *prima facie* case of double patenting because it does not make clear either (A) the differences between the inventions defined by the conflicting claims or (B) the reasons why a person of ordinary skill in the art would conclude that the invention defined in the claim at issue would have been an obvious variation of the invention defined in a claim in the patent. As such, the applicant respectfully requests the examiner to either withdraw the rejection or provide a complete analysis that addresses all the factual inquiries set forth on page 800-21 of the M.P.E.P.

#### IV. Conclusion

In view of the above amendment, the applicant believes the pending application is in condition for allowance. If there are any formal matters remaining after this reply, the applicant respectfully requests the examiner to telephone the undersigned. If there are any additional fees associated with the filing of this reply, please charge them to deposit account no. 04-1073.

Dated: 5/24/06

Respectfully submitted,

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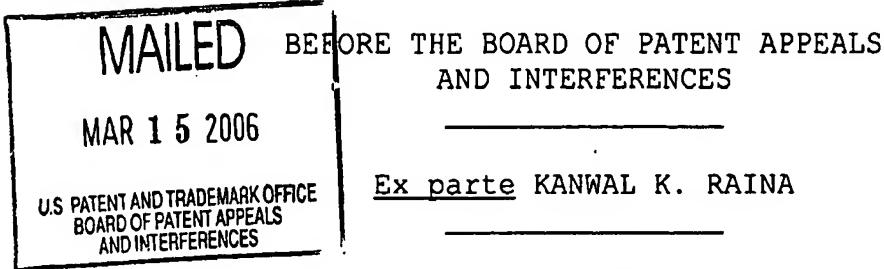
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The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE



Appeal No. 2006-0374  
Application No. 10/120,511

ON BRIEF

Before GARRIS, PAK and JEFFREY T. SMITH, Administrative Patent Judges.

GARRIS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal which involves claims 1, 3, 5, 7-11 and 24-27.

The subject matter on appeal relates to a method of treating at least one flat panel display current emitter which comprises exposing a native oxide-containing tip of a current emitter to a hydrogenation process and exposing the hydrogenation process-treated tip of the current emitter to a nitrogen infusion

process, wherein the hydrogenation process-treated and nitrogen-infusion tip has a reduced atomic concentration of silicon and oxygen relative to the atomic concentration of the native oxide-containing tip. Further details of this appealed subject matter are set forth in representative independent claim 1 which reads as follows:

1. A method of treating at least one flat panel display current emitter, said method comprising:

a) exposing a native oxide-containing tip of said at least one current emitter to a hydrogenation process comprising plasma enhanced chemical vapor deposition conducted in the presence of a silane gas in a reaction chamber, wherein said plasma enhanced chemical vapor deposition process is conducted with a silane gas flow rate of about 1000 sccm, an RF power of about 200-300 watts, a chamber pressure of about 1200 mtorr, and a deposition period of about 5 to 10 minutes; and

b) exposing said hydrogenation process-treated tip of the at least one current emitter to a nitrogen infusion process,

wherein said hydrogenation process-treated and nitrogen-infused tip has a reduced atomic concentration of silicon and oxygen relative to the atomic concentration of said native oxide-containing tip.

The references set forth below are relied upon by the examiner as evidence of obviousness:

Maa	4,411,734	Oct. 25, 1983
Shimbo	4,624,737	Nov. 25, 1986
Doan et al. (Doan)	5,186,670	Feb. 16, 1993
MacDonald et al. (MacDonald)	5,199,917	Apr. 6, 1993
Neukermans	5,658,710	Aug. 19, 1997
Miyamoto	5,747,384	May 5, 1998
Cathey et al. (Cathey)	5,853,492	Dec. 29, 1998
Iyer et al. (Iyer)	5,917,213	Jun. 29, 1999

All the appealed claims are rejected under 35 U.S.C. § 103(a) as follows:

- (a) claims 1, 9 and 10 are rejected over Neukermans in view of Cathey, Miyamoto and Maa;
- (b) claims 3, 5 and 11 are rejected over the above-noted references and further in view of Shimbo;
- (c) claims 1, 3, 5, 7 and 9-11 are rejected over Neukermans, Cathey, Miyamoto, Maa, Shimbo and Iyer;
- (d) claim 8 is rejected over Neukermans, Cathey, Miyamoto, Maa, Shimbo, with or without Iyer, and further in view of Doan;
- (e) finally, claims 24-27 are rejected over Neukermans in view of Cathey, Miyamoto and MacDonald.

We refer to the Brief and Reply Brief and to the Answer respectively for a complete discussion of the opposing viewpoints expressed by the appellant and by the examiner concerning the above-noted rejections.

OPINION

For the reasons which follow, we cannot sustain any of the rejections advanced on this appeal.

Concerning the rejection of claim 1 and indeed all of the rejections on appeal, the examiner expresses the following position concerning the Neukermans reference:

Neukermans . . . teaches a method of treating an array of current emitters (col. 3, lines 21-37) comprising:

- a) exposing a native oxide-containing tip of said at least one (silicon) current emitter to a native oxide removal process to remove the native oxides (col. 3, lines 17-20); and
- b) exposing the native oxide-free tip of said at least one current emitter to a nitrogen infusion process to form a treated current emission surface of said tip (col. 5, lines 31-51) [Answer, page 6].

With further regard to this reference, the examiner acknowledges that "Neukermans . . . does not explicitly teach [, inter alia,] that the emitters are used in a flat display panel" (Answer, page 6) but concludes that:

[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the method of Neukermans . . . to have produced an array of field emitter tips for a flat panel display field emission device because Neukermans . . . teaches that its method is suitable for producing field emissive silicon tips, and Cathey . . . teaches that flat panel displays are a conventional use for an array of field emissive silicon tips [Answer, pages 6-7].

Although each of the rejections formulated by the examiner includes numerous other findings of fact and conclusions of law, we need not discuss these other findings and conclusions in order to resolve the subject appeal. This is because the examiner's afore-quoted findings and concomitantly the conclusion of law based thereon include fatal error. Specifically, the examiner

has erroneously determined that Neukermans' method of treating an array of current emitters, which is disclosed at lines 21-37 in column 3, includes the step of "exposing the native oxide-free tip of said at least one current emitter to a nitrogen infusion process to form a treated current emission surface of said tip (col. 5, lines 31-51)" (Answer, page 6).

The Neukermans reference is directed to the formation of superhard, durable and inert microstructures such as tips for atomic force microscopy and field emission, membranes, hinges, actuators and sensors wherein the microstructures are reacted with a hydrocarbon or an ammonia gas in order to convert surface layers of the silicon microstructure to, respectively, SiC (which is useful for its conductive properties) or Si<sub>3</sub>N<sub>4</sub> (which is useful for its insulative properties). See the abstract of Neukermans. While the examiner is correct that lines 21-37 in column 3 of this reference teach an embodiment wherein the microstructures are formed as an array of tips for field emission purposes, it is significant that these tips are exposed to a hydrocarbon gas in order to form a silicon carbide surface layer (see lines 26-32 in column 3), thereby yielding "electrically conductive tips [which] have an advantage when used in field emission" (see lines 33-34 in column 3). Nowhere does patentee

quoted finding. Rather, as just explained, the tips of patentee's array are exposed to a hydrocarbon gas in order to form a silicon carbide surface layer having electrically conductive properties useful for field emission purposes.

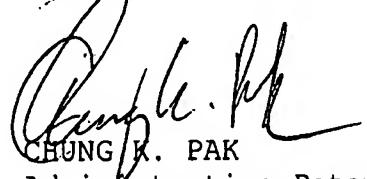
It is true that Neukermans discloses in lines 31-51 of column 5 an embodiment wherein his microstructures are exposed to nitrogen in the form of ammonia gas in order to form a  $\text{Si}_3\text{N}_4$  layer. However, this embodiment is completely unrelated to the column 3 teaching directed to an array of tips for field emission purposes. Indeed, this column 3 teaching is incompatible with the column 5 embodiment. This is because Neukermans expressly teaches that his  $\text{Si}_3\text{N}_4$  layer is useful for its insulative properties (again, see the abstract) and that this silicon nitride layer is formed "when electric insulation is paramount" (column 5, lines 65-66). Thus, forming an insulating silicon nitride layer on the tips of patentee's field emission array embodiment in column 3 would be counterproductive to the electrically conductive purpose served by the tips of this array.

In light of the foregoing, it is apparent that Neukermans' column 3 method of treating an array of current emitters, even if modified in each of the numerous ways proposed by the examiner in view of the other applied references, would fail to include the appealed claim 1 step of "exposing said hydrogenation process-

modified in each of the numerous ways proposed by the examiner in view of the other applied references, would fail to include the appealed claim 1 step of "exposing said hydrogenation process-treated tip of the at least one current emitter to a nitrogen infusion process" as well as the corresponding step of the other method claims on appeal. We hereby reverse, therefore, each of the § 103 rejections advanced by the examiner on this appeal.

The decision of the examiner is reversed.

REVERSED

  
BRADLEY R. GARRIS  
Administrative Patent Judge  
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CHUNG K. PAK  
Administrative Patent Judge  
}  
  
  
JEFFREY T. SMITH  
Administrative Patent Judge  
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} BOARD OF PATENT  
} APPEALS AND  
} INTERFERENCES

BRG:clm

Appeal No. 2006-0374  
Application No. 10/120,511

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